

UNIVERSITY OF CAMBRIDGE
DEPARTMENT OF HISTORY AND PHILOSOPHY OF SCIENCE

FREE SCHOOL LANE
CAMBRIDGE CB2 3RH
TEL : 01223 334540(334556)
FAX: 01223 334554

Professor Michael Redhead FBA
Chairman of Department

21.1.96

Dear Gian Carlo,

I have now had time to return to your letter of 6th December and would like to offer the following comments.

There are two crucially distinct readings of OM-LOC:

(1) There is the reading which prohibits measurement procedures on the left from affecting measurement outcomes on the right. This is a case by case version of the probabilistic parameter independence, P.I.

This is the reading which is actually used in the derivation of
$$Q.M. \wedge \text{Compl. } \wedge (OM-LOC) \supset \neg (ER-LOC) *$$

P.T.O.

and hence the denial of OM-Loe in this sense can indeed block the derivation of $\neg(ER-Loe)$ as we all agree.

(2) But there is a logically stronger sense that prohibits not only setting-to - result effects at space-like separation, but also result-to-result effects (i.e. a case by case version of O.I.)

Now it is crucial for the logical structure of your argument that you use the logically weakest version of OM-Loe that is necessary for the result \times to hold.

If you use a stronger version than is necessary, you cannot infer that a failure of this stronger version will block the derivation of $\neg(ER-Loe)$.

That is just a matter of straight logic.

Now in your discussion of the relation between OM-Loe and B-Loe, you are all

the time using ^{II} the stronger version
of OM-loc, since in your examples
you refer to the question of whether
the outcomes of the two measurements
influence one another.

Referring to my previous letter
dated 5th November, I was always
using the weak version of OM-loc,
and for that version, I maintain
that my discussion of the
problematics ~~of~~ of deriving

$$\text{OM-loc} \supset \text{B-loc}$$

was correct.

I would like now to deal with your
Example 3, in which you claim that
 $\text{OM-loc} \supset \text{P.I.}$, requires a No Conspiracy
description.

If Alice selects ^{by some rule} ~~when~~ to top, then she
is inducing a place-selection on the
random sequence generated by Bob. If
this altered the limiting frequency of Bob's
results this would contradict the randomness
P.I.

of Bob's sequence. But if Bob's sequence really is random, this could not happen!

If you agree with the points in this letter, then I suggest the best way forward would be as follows: I enclose a copy of a revised version of the paper with La Rivière, which I think summarizes my considered point of view on this vital question of a correct relativistic formulation of the EPR argument. I have been asked by Bob Cohen whether I would consider contributing this paper to the Shimony Festschrift he is editing. I would be happy to do this, and then you could raise additional points and comments in a further submission to Studies in History and Philosophy of Modern Physics.

I would play no part in the editorial discussion of such a submission.

III

but would leave this for Jeremy to sort
out with you.

I have very much enjoyed, and
benefited from, our discussions of this
matter.

With very best wishes

Michael

P.S. I should add in relation to
your discussion of why the violation
of OM-Loc is less serious than
the violation of ER-Loc from a
relativistic point of view, that
you again use the strong version
of OM-Loc, when you talk, for
example, of a "violation of OM-Loc -- due
to a violation of O.I."